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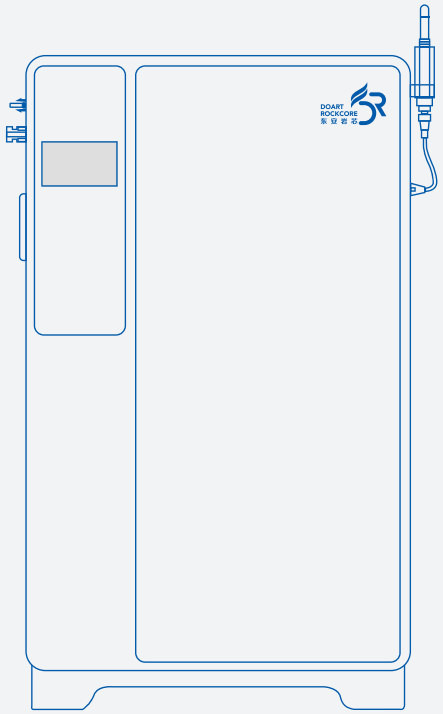

User Operation Manual

Off Grid Inverter System

DR-AIO-05205FL
DR-AIO502022FL01

Version: 1.2

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Legal Information

In order to protect the legitimate rights and interests of users, please read our operating procedures and safety instructions carefully before using this equipment. Please operate the equipment according to the operating procedures and safety instructions.

Once using this device, you are deemed to have read, understood, endorsed and accepted all terms and contents of the device's operating procedures and safety instructions. The user is committed to being responsible for his or her own actions and all consequences arising therefrom.

The User undertakes to use the device solely for legitimate purposes and agrees to these Terms and any relevant national policies or guidelines.

In the process of using this equipment, please strictly observe and implement the requirements including but not limited to the operating procedures and safety instructions. All personal injury, accident, property damage, legal disputes and other adverse events that cause conflicts of interest caused by violations of the use instructions or force majeure indicated by the safety instructions are the responsibility and loss of the user. Our company will we do not assume any responsibility.

Caution!

- Be sure to read this manual before installing this product.

Contents

1. Application Scope

The DR-AIO-05205FL is one of the new energy storage products designed with lithium iron phosphate batteries, which can provide reliable power supply support for various equipment and systems. DR-AIO-05205FL is suitable for household power supply, backup power supply, limited installation space, long cycle life.

This manual describes the assembly,installation,operation and troubleshooting of this unit.

Please read this manual carefully before installation and operation.Keep this manual for future reference.

This manual provides safety and installation guidelines as well as information on tools and wiring.

2. Functional Features and Safety Precautions

2.1 Functional Features

- The whole module is non-toxic, pollution-free and environmentally friendly.
- The cathode material is LiFePO4, which provides good safety performance and long cycle life.
- It provides protection against overcharging, over-discharging, over current, short circuits, and other issues to ensure the safe and stable operation of the system.
- The multi-functional touch screen display allows you to view various data and the status of the product.
- It can detect cell temperature, ambient temperature, and the MOS temperature of the power supply, and it will trigger an alarm and take protective action when charging and discharging at high or low temperatures. The battery BMS has a total of 6 temperature detection channels: 4 for battery cell temperature detection, 1 for ambient temperature detection, and 1 for power MOS temperature detection.
- It features RS485 communication functionality.
- UPS function can be used for important office environment and critical commercial use, It can prevent sudden power outage backup switching power supply, the switching time is less than 20 ms, and the maximum AC output power 5000 W.

- Support mobile APP and cloud to view data, Wi-Fi communication function: Download and install a special APP on the mobile phone, use Bluetooth distribution network and wireless communication with DR-AIO-05205FL, you can view the operating status of the energy storage system and set relevant parameters. Supports Android and IOS systems.
- Full digital voltage, current double closed-loop control, advanced SPWM technology,

2.2 Safety Precautions ⚠

- Before using the device, carefully read all instructions, cautionary markings on the unit and batteries, as well as the relevant sections of this manual.
- Do not disassemble the unit. Take it to a qualified service center for servicing or repairs. Incorrect reassembly may pose a risk of electric shock or fire.
- To reduce the risk of electric shock, disconnect all wiring before performing any maintenance or cleaning. Turning off the unit will not eliminate this risk.
- For optimal operation, select the appropriate cable size according to the required specifications. Correct operation of this inverter/charger is essential.
- A fuse is provided to protect the battery supply from over-current.
- Grounding Instructions: This product must be connected to a permanently grounded wiring system. Ensure compliance with local requirements and regulations during installation.
- NEVER short-circuit the AC output. Do NOT connect to the AC input if there is a DC input short circuit.
- Warning!! ⚠ Only qualified service personnel are authorized to service this device.If issues persist after following the troubleshooting guide, please return the product to your local dealer or service center for maintenance.

▶ Warning symbol description:

	Flammability risk.
	Keep the battery away from open flame or ignition sources .
	Danger of high voltages. Risk to life due to high voltages in the energy storage system .
	Danger. Risk of electric shock!
	Do not touch the product for 5 minutes after shutdown.
	CE Certification .
	Please read enclosed documentation carefully before using the product.
	This symbol indicates that this product should not be disposed of with household waste within the EU. To prevent potential harm to the environment or human health from improper disposal, please recycle it responsibly to support the sustainable reuse of materials. To return your used device, please utilize local return and collection systems or contact the retailer where the product was purchased. They will ensure the product is recycled in an environmentally safe way.
	Product is not waterproof.

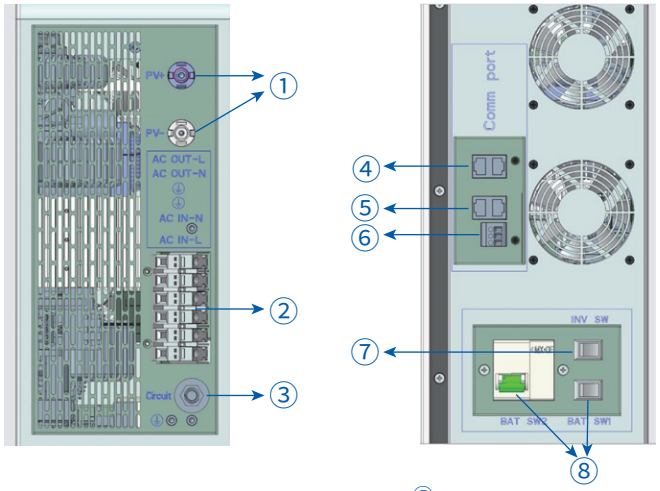
3. Specification

Model	DR-AIO-05205FL
AC Output	
Nominal AC Output Power	5000W
Nominal AC Output Voltage	230Vac
Nominal AC Output Frequency	50Hz/60Hz
Rated Current	21.7A
UPS Transfer Time	20mS
Peak Efficiency	92%
Output Voltage Waveform	Pure Sine Wave
Overload Protection	10s@≥110% load;
AC Input	
AC Input Voltage Range	100-300Vac
AC Input Frequency	50/60Hz
AC Maximum Input Current	26A
PV Input	
Maximum PV Voltage	500Vdc
PV Voltage Range	140V-480Vdc
PV Input Power	6000W
PV Maximum Input Current	15A
Isc PV	18.7A
Battery	
Rated Voltage	51.2V
Nominal Capacity	100Ah
Cycle life	5000 cycle@25℃ 0.5C 80% DOD
Voltage Range	44.8-58.4V
Maximum Charging Current	50A
Maximum Discharging Current	100A

Machine	
Weight	61±2kg
Dimension	855*500*167.5mm
Ingress Protection	IP20
Ambient Temperature and Relative Humidity Ratings	-10 to +50 ℃ 0% to 95%RH, condensation
Maximum Altitude Rating	≦2000m
Cooling Method	Air cooling
Pollution Level	1
Isolation or not	Isolate
Suitable Environment	Indoors
Protection Class	I
Over Voltage Category	DC:OVC II /AC:OVC III

4. Product Appearance

5. Port Definition



① PV Input
② AC Output & PE-GND & AC Input
③ AC Input Over current protection switch
④ RS232 Connect WIFI, computer communication
⑤ Parallel communication port
⑥ Dry Contact
⑦ INV_SW Inverter start switch
⑧ BAT_SW1 & BAT_SW2 Battery weak switch and main circuit switch

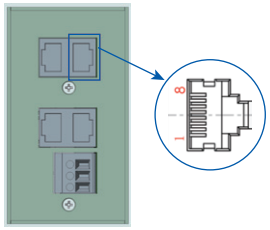
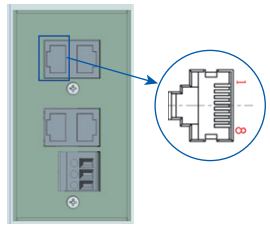
▶ Product functions are defined in the following chart:

Item	Pin	Definition	Remarks
PV Input	PV+	Photovoltaic input positive electrode	
	PV-	Photovoltaic input negative electrode	
AC Port	AC-OUT-L	AC output phase line	
	AC-OUT-N	AC output neutral line	
	P-GND	Output ground wire	
	P-GND	Input ground wire	
	AC-IN-N	AC Input neutral line	
	AC-IN-L	AC Input phase line	
Dry Contact	1	NC,Normally closed contact	1,2PIN
	2	N，Central contact	
	3	NO，Normally open contact	2,3PIN

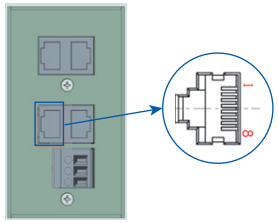
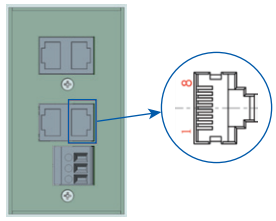
Dry Contact Signal:
- There is a 3PIN dry contact (3A/250VAC) on the panel, 1pin and 2pin are normally closed, 2pin and 3pin are normally open, and 2pin is the midpoint
- DSP uploads the battery voltage to the communication board, and after the communication board receives it.

- The voltage range should be between 40V and 64V, undervoltage point 44V, recovery point 54V.
- If the battery voltage is less than 6V, the relay closes.
- When the battery voltage falls below the undervoltage point, the relay closes.
- When the battery voltage is higher than the recovery point, the relay is disconnected.

▶ Communication(RS485)

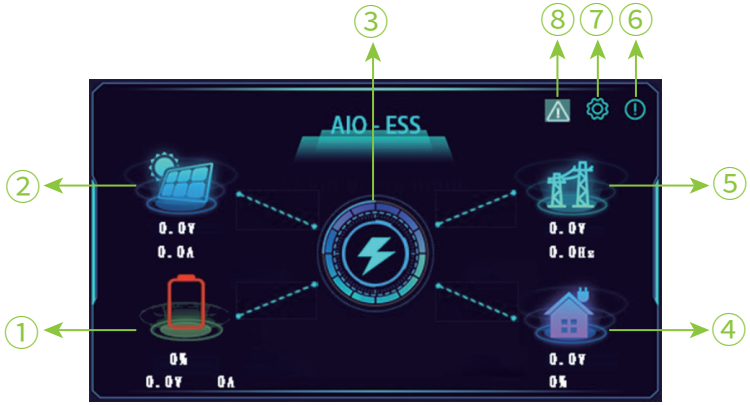
Item	Illustration	Pin	Definition	Remarks
RS485 &CAN		1,8	RS485_B	Not for public use
		2,7	RS485_A	
		4	CAN_H	Not for public use
		5	CAN_L	
		3,6	GND_S1	
RS232		1	RXD	Connect to WIFI collector
		2	TXD	
		3,5,6,7	NC	
		4	VCC	12Vdc
		8	GND_S1	

▶ Parallel Communication Port (CAN)

Item	Illustration	Pin	Definition
CAN		1	PARA_CAN_H
		2	PARA_CAN_L
		3,6	NC
		4	SYN
		5	GND_S1
		7	SHARE_I-
		8	SHARE_I+
CAN		1	PARA_CAN_H
		2	PARA_CAN_L
		3,6	NC
		4	SYN
		5	GND_S1
		7	SHARE_I-
		8	SHARE_I+

6. Display Operation and Precautions

6.1 Description of Screen Functions



① After connecting the PV input to the PV panel, the input voltage and current of the PV will be displayed. Touch the icon to enter the PV interface, and you can view the status of the PV.

② The lithium battery will display the current battery power and voltage value, and the current value will be shown during charging and discharging. Touch the button to enter the battery information interface and view the battery data information.

③ Inverter, touch this button to enter the inverter screen and view the inverter data.

④ PCS output and home load display: shows the PCS output voltage and load current when a load is connected. Tap the icon to view load output data.

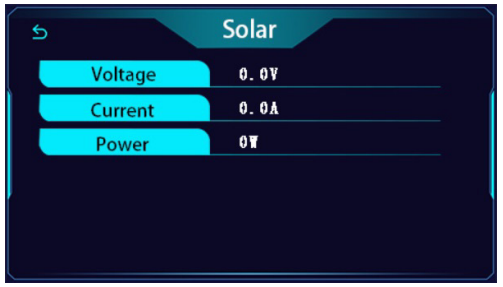
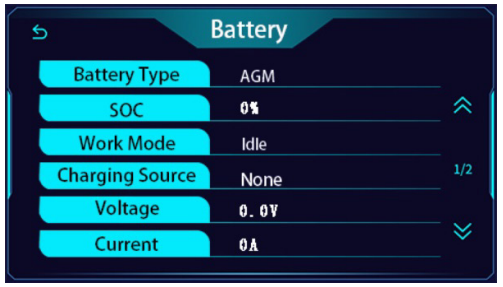
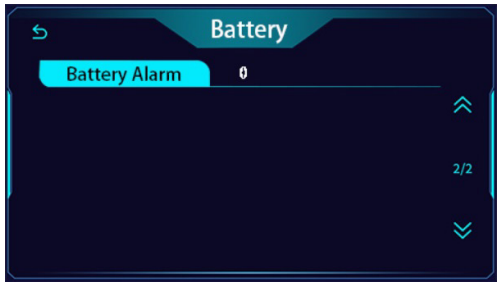
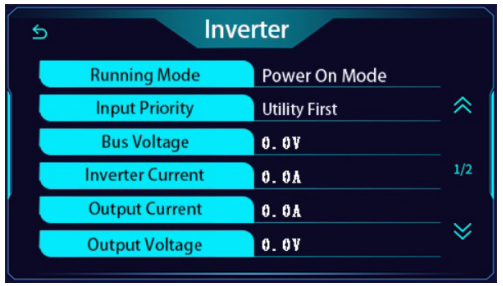
⑤ AC input: AC input voltage and AC input frequency are displayed when the AC input is connected. You can view the AC input information by touching the icon.

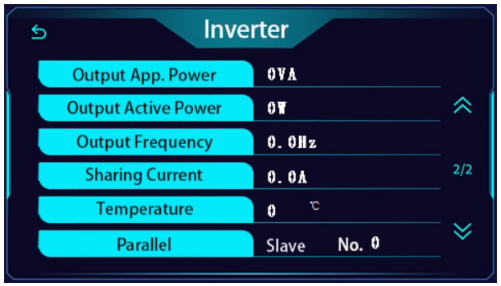
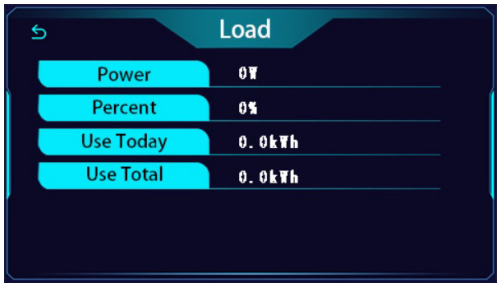
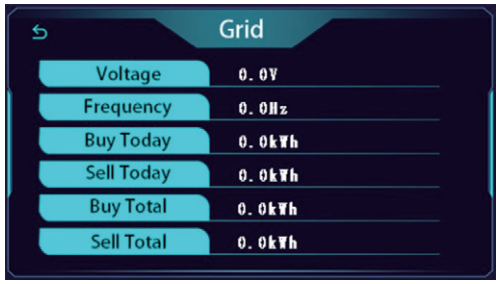
⑥ Product information: touch the icon to view the product information.

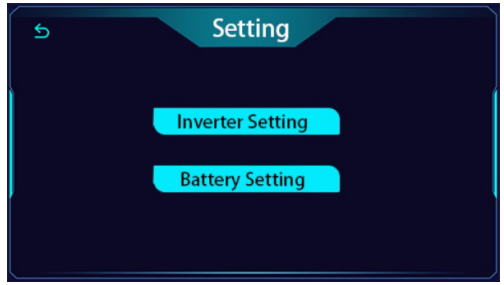
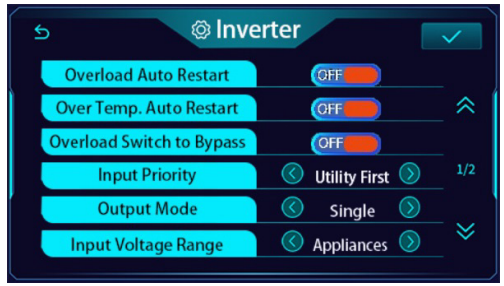
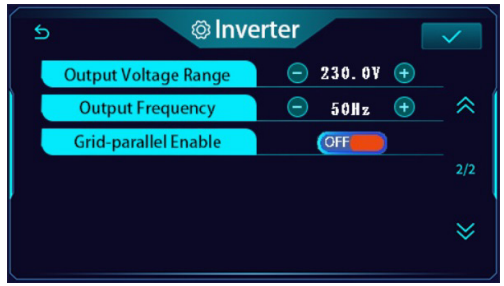
⑦ Parameter Settings: you can set battery and inverter parameters, touch the icon to enter the menu option, you can set battery and inverter parameters.

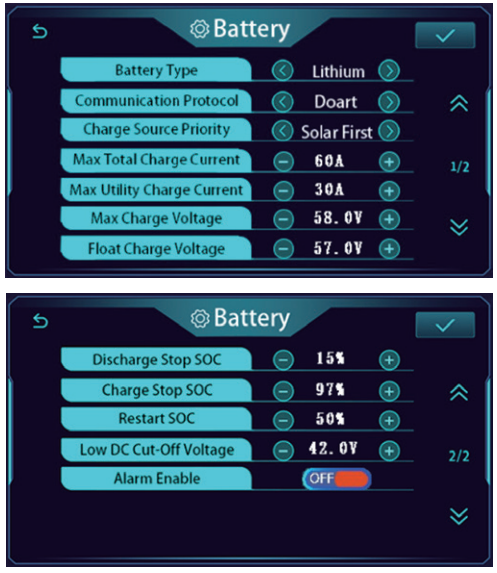
⑧ Alarm and Fault status: when the icon blinks, an alarm or fault exists. You can touch the icon to view the specific alarm or fault code.

6.2 Function Parameters Setting and LCD Display

Item	Description	LCD picture and setting parameter description
①	PV Input	
②	Lithium-ion battery' information	 
③	Inverter	

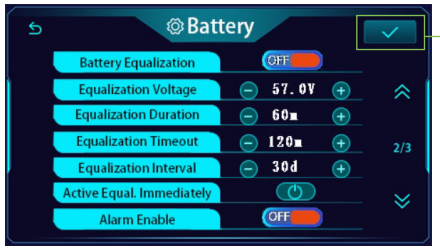
③	Inverter	
④	PCS Output(Load)	
⑤	Grid	
⑥	Product Information	

⑦	Parameter Setting	
	7.1 Inverter Setting	 
	Overload Auto Restart	Automatic restart on/off when overloaded.
	Over Temp.Auto Restart	Over temperature automatically restarts on/off.
	Overload Switch to Bypass	Switch from overload to bypass on/off. When an overload occurs in battery mode, the device will automatically switch to AC Input mode.
	Output Mode	Single : The SIG inverter runs on a single device. Parallel: This function is not available L1 Phase, L2 Phase ,L3 Phase : This function is not available

⑦	Input Priority	Utility First : The AC Input supplies power to the load first. Powered by solar or battery only. Solar or battery power is used only when AC Input power is unavailable.
		Solar First : Solar power is given priority to the load. If solar energy alone is insufficient to power the connected load, both the AC Input and solar power will supply the load simultaneously. The battery will provide energy under any of the following conditions: - Both Solar and AC Input power are unavailable. - Solar energy is low and AC Input power is not available.
		Solar Battery Utility : Solar power supplies the load first. If the solar power is insufficient, the battery will be used. The AC Input supplies power to the load only when the battery voltage drops to the low voltage warning threshold or the State of Charge SOC cutoff point.
	Input Voltage Range	Appliance: The acceptable input voltage range is 90-280VAC.
		UPS: The acceptable input voltage range is 170-280VAC. (default)
	Output Voltage Range	The default value is 230V. The option is 220V, 230V, or 240V.
	Output Frequency	The default value is 50Hz. 50Hz or 60Hz is optional.
	7.2 Battery Setting	

1	Battery Type	LIB: Lithium (default)
	Communication Protocol	Doart
	Charge Source Priority	Configuration power supply charging priority, if the inverter is online, bypass or fault mode, charging power can edit the following items:
		Solar First : Solar priority to charge the battery. The battery is charged by the AC Input when solar power is not available.
		Solar & Utility (default) : Both solar and AC Input charge the battery.
		Solar Only : Solar is the only charging power source, whether AC Input power is available or not. If this inverter/charger is operating in battery mode, only solar energy can charge the battery. If solar energy is available and sufficient, it will charge the battery.
	Max Charging Current	The maximum value is 50A. The default value is 50A.
	Max Utility Charging Current	Max. 50A, adjustable.
	Max Charging Voltage	Default 56V.
	Float Charging Voltage	Default 54.4V.
2	Discharging Stop SOC	Default 20%
	Charging Stop SOC	The default value is 97%. The value ranges from 60% to 100%. The value must be greater than the discharge cutoff SOC.
	Restart SOC	The default is 25%, it needs to be limited to the charging cut-off Soc and discharge cut-off SOC.
	Low DC Cut-Off Voltage	Default 42V .
	Alarm Enable	This function can be enabled or disabled.

⑧	Alarm and Fault Status	



After setting the parameters, you need to click the button to confirm

Note: All settings applied on the display will only take effect after the inverter is restarted.

To change the operating mode (the default is Solar Battery Utility mode), turn off the inverter (INV_SW), connect the AC input or PV input to the power supply, and configure the settings. Once the settings are confirmed, disconnect the AC input or PV input, and restart the inverter.

⑧ Fault Reference Code			
Code	Fault Code Description	Code	Fault Code Description
01	Fan is locked when inverter is off.	51	Over current or surge
02	Over-temperature protection	52	Bus voltage is too low
05	Output short circuit or over temperature is detected by internal converter components	53	Inverter soft start fails
		55	The output DC component value is too high
06	Output voltage is too high	57	Current sensor fails
07	Overload timeout	58	Output voltage is too low
08	Bus voltage is too high	59	PV voltage is over-limitation
09	Bus soft start failed		
10	PV over current		

⑧ Alarm Reference Code		
Code	Alarm code description	Audible Alarm
01	Fan is locked when inverter is on	Beep every 3 seconds
02	High temperature power drop predict warning	The buzzer starts every three seconds
03	Battery is over-charged	Buzzer is not beep
04	Low battery	Buzzer is not beep
05	The battery is lower than the cut-off SOC alarm	Buzzer is not beep
07	Overload	The buzzer starts once every second
10	AC Input power derating warning	Buzzer is not beep
12	Battery is not connect	Buzzer is not beep
13	Bms alarm or comm lost	Beep every 3 seconds
15	PV energy is low.	Buzzer is not beep
14	AC output power is derating warning	Beep every 3 seconds

Note: **Warning 14 Report**: The PCS temperature is approaching the upper protection limit. Please reduce the connected appliances or load equipment to a more appropriate power range. The temperature alarm activates at 71°C, and derating begins at 75°C, with a 10% reduction in output power for each degree above this threshold. Please check the inverter temperature on the display.

6.3 Operating Mode Description

▶ Line Mode:

The device will supply output power from the AC input and simultaneously charge the battery in "line mode."

▲ AC Input and solar charging.

▲ AC Input charging.

If solar energy is set as the priority output source and is insufficient to power the load, both solar energy and AC input will supply power to the load while simultaneously charging the battery.

If solar power is set as the output source priority, but the battery is not connected to the inverter, both solar power and AC input will supply power to the load simultaneously.

▲ The AC Input supplies power to the load.

▶ Battery Mode:

1.The device will provide output power frombattery and PV power.

2.The device will provide both battery and photovoltaic output power.

▲ Batteries and solar power supply the load .

▲ The solar power will supply the load and charge the battery.

▲ Battery power will supply the load only .

▶ Solar Energy Model:

The device will provide both battery and photovoltaic output power.

▲ Powered only by solar energy.

7. Product Installation and Precautions

7.1 Installation Equipment ⚠

Before choosing an installation location, consider the following:

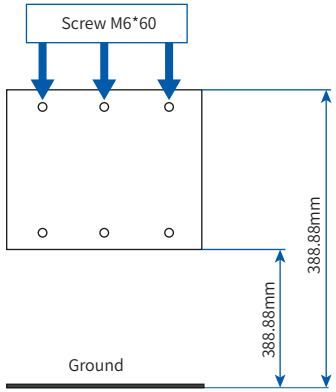
- Do not install the product on flammable building materials.
- Installed on solid surface (concrete solid wall, solid brick wall).
- The product should be installed at an ambient temperature between 0 °C and 50 °C to ensure optimal operation.
- The recommended installation position is vertical, mounted against a wall.
- Ensure that there is no obstruction within 0.5 meters on both the left and right sides, and keep the product's cooling air ducts clear.

Note: Frequent exposure to extreme temperatures may decrease the product's performance and lifespan.

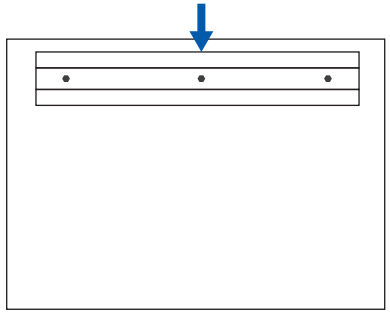
7.2 Installation Procedure

Installation Method 1- Floor Installation：

Step 1: Attach the positioning hole sticker to the wall at the indicated height, ensuring the bottom edge of the sticker is no more than 388mm from the ground

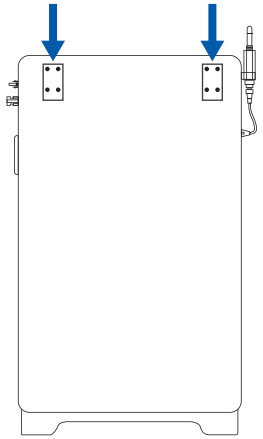


Step 2: Using the positioning sticker as a guide, drill holes in the wall at the marked locations with appropriate tools. Install the screws and fixing brackets into these holes

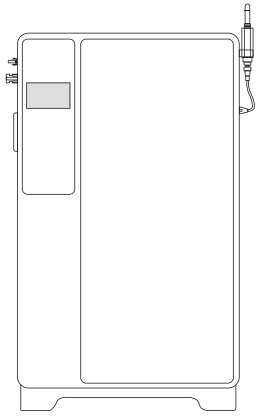


Step 3: Install the fixed fittings onto the product.

Step 4: After completing the above steps, hang the product onto the wall-mounted brackets



Step 3



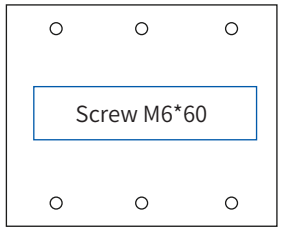
Step 4

Installation Method 2- Wall-mounted installation(recommended)

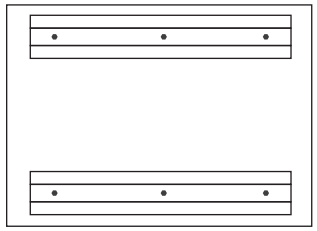
Customers can choose the installation method based on their specific needs. For wall-mounted installation, special attention must be given to the following: ensure that the wall is a solid concrete wall capable of supporting a load of at least 150 kg.

Step 1: Attach the positioning hole sticker to the wall according to the height in the following figure. The starting position of the positioning hole sticker is more than 400mm from the ground.

Step 2: Using the sticker as a guide, drill holes in the wall at the six marked locations using appropriate tools. Install the screws and two fixing brackets into these holes.



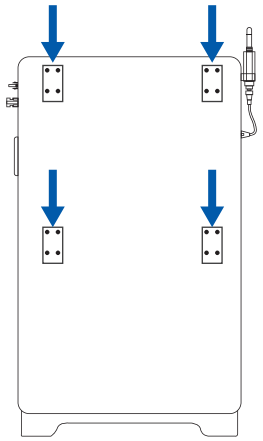
Step 1



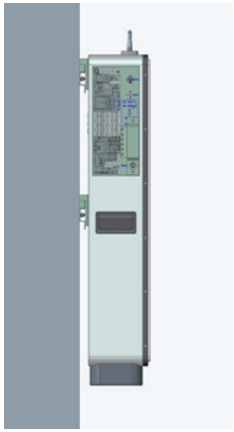
Step 2

Step 3: Attach the fixed fittings to the product

Step 4: After completing the above three steps, you can hang the product on the wall-mounted brackets.



Step 3



Step 4

7.3 Installing the Wi-Fi Collector

Secure the Wi-Fi collector to the screw holes on the side, and connect the communication cable to the network cable port located in the upper left corner (Figure 7-1).

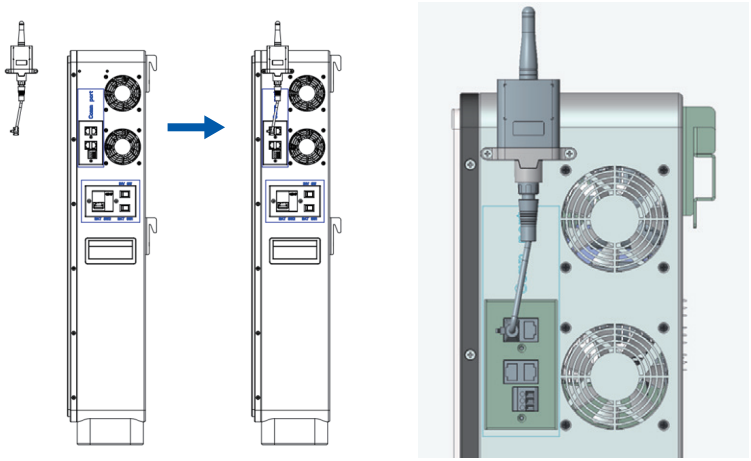
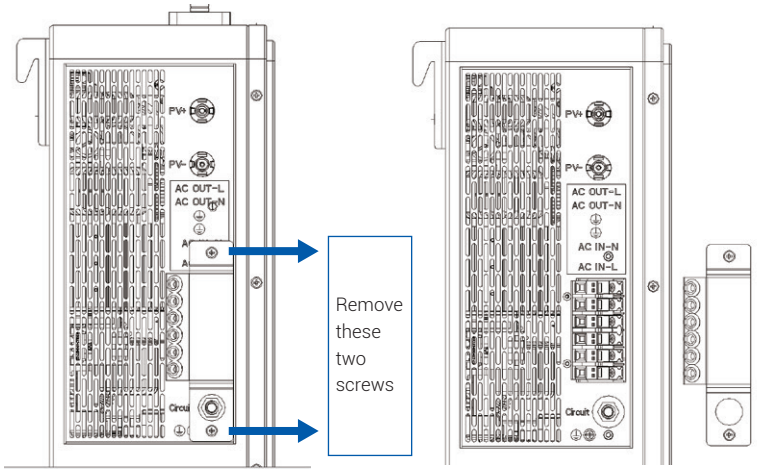


Figure 7-1

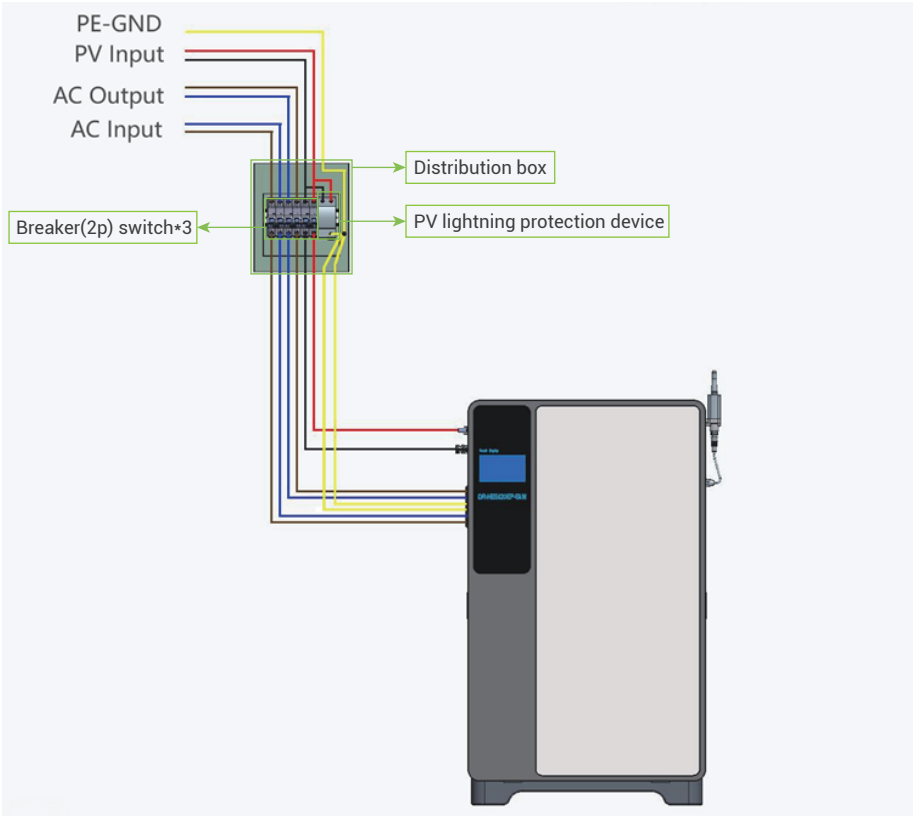
7.4 Preparations

Before connecting any cables, remove the two screws shown below and take off the protective cover from the connector.



7.5 Product Installation and Wiring Diagram

Product wiring diagram can refer to the following figure:



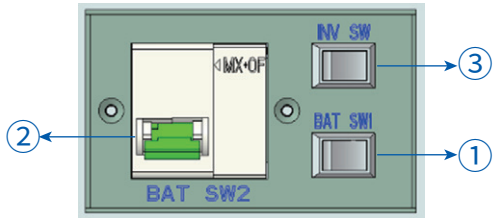
NOTE: All wiring must be performed by qualified personnel.

Selecting the appropriate cables for AC input connection is very important for the safe and efficient operation of the system. To reduce the risk of injury, it is recommended to use cables with a 10AWG specification.

7.6 Power-on operation

If the device is installed correctly, follow these steps to complete the startup process:

① Press the SW1 battery switch.
② Switch the SW2 circuit breaker to the upward position.
③ Open the INV_SW switch.



Please boot the machine in the order of ①-②-③ in the picture

Follow the shutdown sequence③-②-①

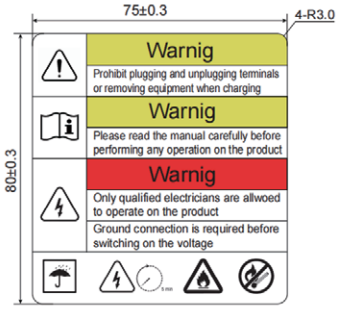
Note1: If the inverter does not start correctly, ensure you follow the normal boot sequence. If it fails to start the first time, you may need to turn off INV_SW and then restart the inverter.

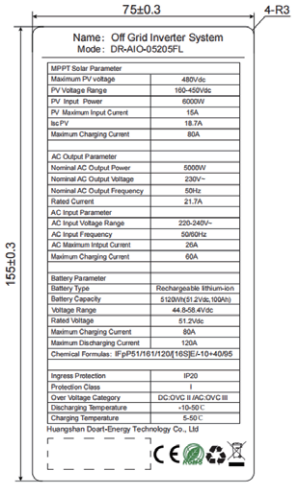
Note2: After installation, clean the dust and debris from the dust filter every 1-2 months. This helps maintain optimal heat dissipation and ensures reliable operation of the product.

Note3: If the battery is not needed, please turn off the battery switch. If the circuit breaker is turned off while the BAT SW1 is turned on, the PV source input will become unstable.

8. Safety Regulations

8.1 Product Label





8.2 Safety Protection

It is recommended to wear the following safety gear when handing the product.


Insulated Gloves


Safety Shoes

Note: Use properly insulated tools to prevent accidental electric shock or short circuits. If insulated tools are not available, cover the entire exposed metal surfaces of the available tools, except their tips, with electrical tape.

8.3 Dangerous Mode

The customer acknowledges the following potential dangers associated with battery operation and use:

1. During operation, there is a risk of chemical damage, electric shock or electric arc. Voltages above 50V DC can cause significant harm. Therefore, customers must exercise caution to avoid electric shock and other electrical hazards.

2. Chemical risks from the electrolyte in the battery.

3. When operating the product, customers must consider potential risks such as accidental short circuits, electric arcs, explosions, or thermal runaway. Appropriate personal protective equipment (PPE) should be used to prevent these hazards.

9. APP Download

Method 1: Download and install the APP by searching.

Open the App Store or Google Play, enter "doart" on the search page and click the "search" button. The search result will be displayed on the page. Click the download button to download the mobile APP.

Method 2: Download and install the APP by scanning the OR code.

Open the mobile browser, click the scan/photo icon on the right of the search input box, scan the QR code corresponding to your mobile device type, and download the installation file.

Android

Google

Apple

Android users can scan the " Android" or "Google store " to download and Apple user can scan the “Apple” OR code search from “Apple store” to download.

After the software is downloaded, locate the downloaded installation package on the Download page and click Install.

After the installation is complete, click the "Finish" button. The app icon will then appear on your phone's home screen.

Next, you can go to WWW.DOART-ENERGY.COM to check the APP operation guide .

Warranty Card	
Product Name	Production Date
Product Bar Code	
Dealer Name	Sales Date
Dealer Address	
Customer Information	
Customer Name	Purchase Date
Customer Tel.	Customer Fax
Customer Address	

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